PHOTOS COURTESY INTEL CORP. AND NOVELL INC.

DIGITAL DESIGN

1985

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SYSTEMS ARCHITECTURE

16-Bit Multiprocessing STD Bus Challenges High-End Solutions
Through the support of 16-bit processors, the STD will continue to hold the low-end processor control market and will grow into the low-end minicomputer market. Sept., pg. 71.

Ada And Modula-2: True Systems Languages?
Ada and Modula-2 are strongly typed modular languages that emphasize program segmentation and data abstraction. Standardization and flexibility differentiate use of the two as well as compiler cost and availability. Aug., pg. 74.

Algorithms Drive Time-Domain Speech Synthesis
Speech synthesis using Mozer Waveform Coding requires simpler electronics to execute because the compressed data is already in the time domain. Nov., pg. 70.

Artificial Intelligence And The Fifth Generation
Researchers are moving beyond conventional artificial intelligence software development to computer architectures specifically designed for AI applications. April, pg. 34.

The Future Of Flexible Disks
Despite the potential for significant improvement, the mainstream of flexible disk technology lags far behind the leading edge. July, pg. 63.

High-End Minis Forge New Application Areas
The advent of semiconductor memory and LSI circuitry has added to the minicomputer boom by allowing faster manipulation, greater accuracy, smaller size and reduced cost. Jan., pg. 68.

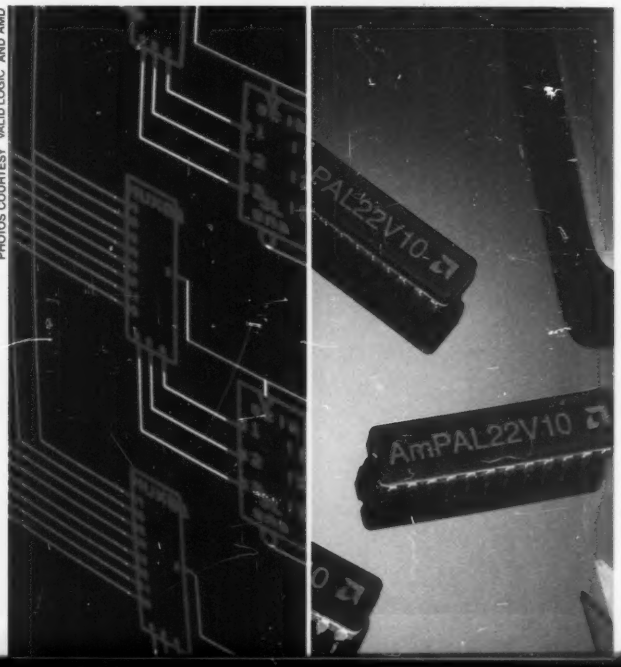
Hybrid Fiber Rings Implement Integrated Services Network
The hybrid ring can adapt to a variety of applications from backend networks, to a backbone LAN or to a distributed PBX. Dec., pg. 50.

Keyboards Range From Single Components To Intelligent Input Subsystems
The data entry full array, full travel keyboard business can be divided into at least two distinct categories: simple, low-cost devices for integral use and high-end, reliable, intelligent peripheral products. March, pg. 64.

Little Drives That Can
Mass memory devices fitting the 3½" form factor have emerged to fill the demands of designers who need to get the most out of every cubic centimeter. May, pg. 43.

Magnetic Tape: Filling The Secondary Storage Gap
The tape industry is undergoing unprecedented activity. Today the industry demands removable secondary mass storage for systems using fixed disks for primary mass storage. Feb., pg. 52.

Making The Most Of 5¼" Winchester Drives For Improving System Performance
In choosing a disk drive, cost, reliability, quantity availability,



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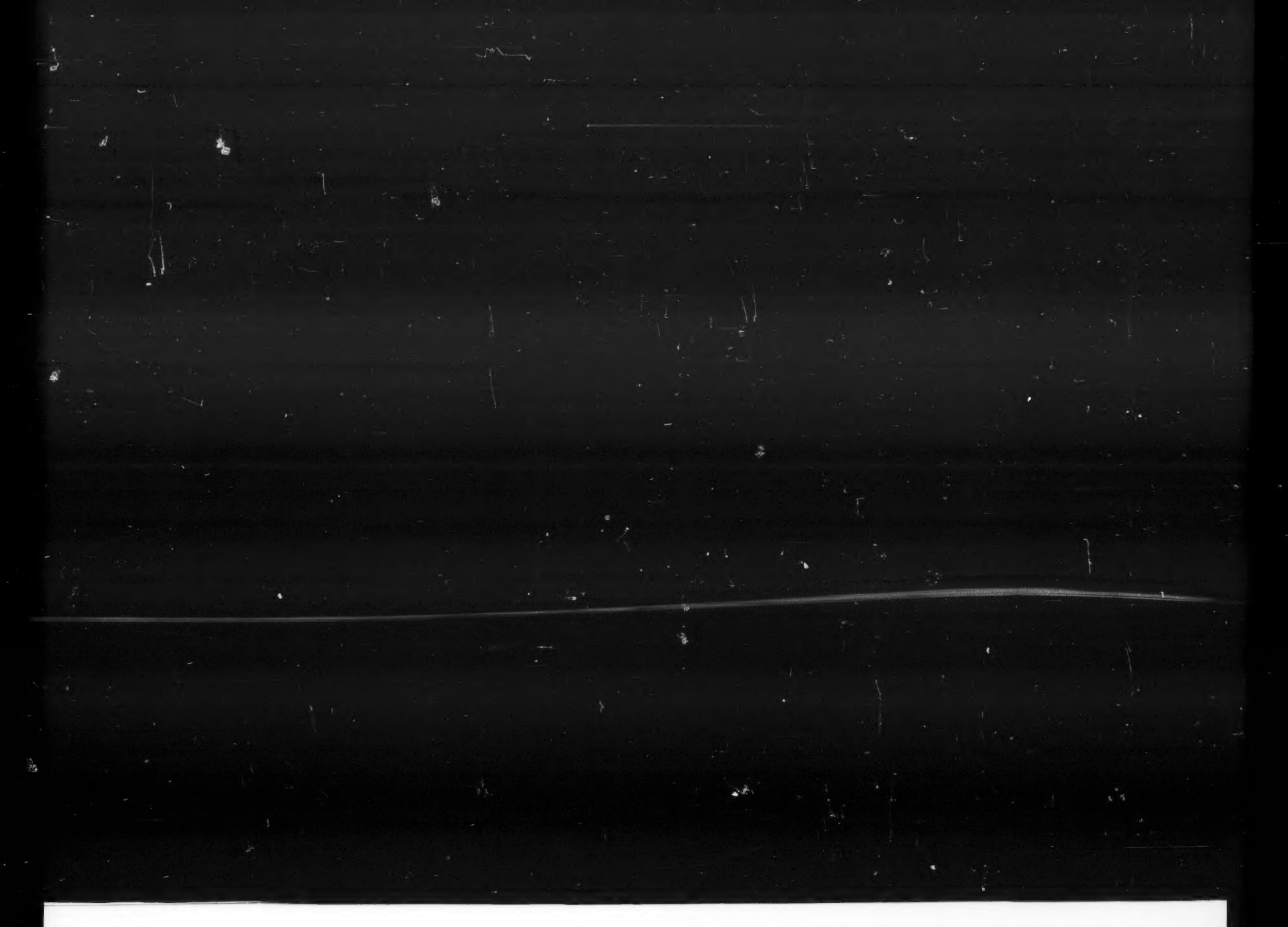

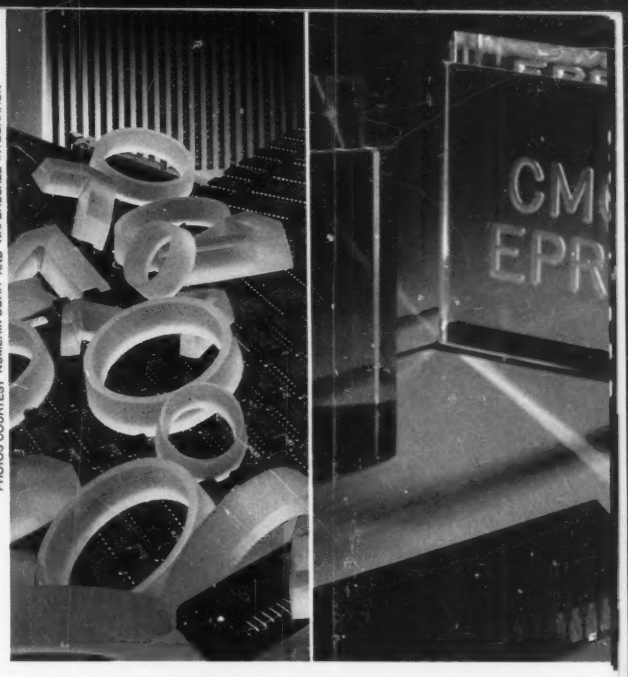

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technological merit and supplier reliability must be balanced and traded-off against each other. Jan., pg. 44.

Micro/J-11 Boosts Performance Of DEC-Compatible Processors
The Micro/J-11 microprocessor has offered the design engineer the potential for designing a wide variety of DEC-compatible equipment. However, it has seen few designs compared to other offerings. April, pg. 60.

Multibus II: The Latecomer Catches Up
Albeit late to market, over 20 vendors will offer over 50 or more Multibus II products during the first quarter of 1986. Nov., pg. 61.

Natural Language Ambiguity or Is The Turkey Ready To Eat?
An unrestricted natural language system remains a distant objective despite considerable progress in artificial intelligence research. Nov., pg. 51.

Operating Systems For Micros—Too Much For Too Little?
Today's operating systems require application programs to interact with graphics, light pens, touch screens, mice, communications protocols, multiple file systems and graphics standards. Jan., pg. 78.

Options Increase For Effective Use Of High-Performance Winchesters
Combined with IPI-2, IPI-3 or enhanced SMD interfaces, sophisticated disk technology may now be put to full use; but testing, design for the application, controller choices and software drivers are still key. Sept., pg. 60.

Outward Appearances Disguise Laser Printer Capabilities
Most laser printers use one of a few engines and thus have similar specifications, but the printer controller and software are the factors that really determine system capabilities. Aug., pg. 69.

PC Network Compatibility Promotes Versatile Systems
IBM's well-supported network scheme will likely spawn activity similar to the crush after the introduction of the IBM PC itself. Feb., pg. 40.

Personal Computers Get Tough; Programmable Controllers Get Smart
The migration of the personal computer from the office to the factory floor raises new questions for systems integrators designing industrial computer systems. Oct., pg. 60.

Protocols Set Course For Next-Generation Networks
The driving force in local area network development remains the same: A network should be a common implementation available from multiple vendors. Dec., pg. 36.

RISC—A Risky New Architecture For The Future?
As the race for higher speed in computers continues, new alternatives proposed are promising better price/performance. RISC (Reduced Instruction Set Computers) is one such choice. March, pg. 92.

Serial A/D Eases Speech Synthesis System Design
Of the various methods used for digital speech synthesis, pulse code modulation (PCM) is probably the most flexible. June, pg. 59.

Speech Recognition: Not A Typical Engineering Problem
The main problem of speech recognition is the same: how to develop a machine which emulates the way humans interpret speech. June, pg. 49.

Systems Architect's Guide To The Multibus
The Multibus marketplace continues to grow rapidly with currently over 200 vendors of products available to the systems integrator. Jan., pg. 32.

Systems Architect's Guide To The Q/Unibus
Data communications products offer the systems integrator a wide variety of options from which to choose. March, pg. 87.

Systems Architect's Guide To UNIX/VMS
UNIX has always been a good match for a system software development environment while VMS is targeted toward a much broader range of applications. Feb., pg. 74.

Systems Architect's Guide To The VME Bus
Only a few buses can support 32-bit processors—VME, Multibus II, NU Bus and Futurebus. Of these, the majority of CPU boards are available on the VME. May, pg. 34.

X.25 Software: Transaction Scheduling Keys Efficiency
As more data communications users turn to the X.25 standard for packet-switched networks, the need for X.25 software packages and implementation hardware is growing dramatically. Dec., pg. 44.

DESIGN TECHNOLOGY

Advanced Microprocessors Demand High-Level Language Support
Microprocessor software development has changed from individual programmers working on a monolithic piece of code to teams of programmers working on individual modules. June, pg. 75.

Army Of CAE/CAD Vendors Enrich PC Power
Today's PC-based CAE/CAD systems offer capabilities rivaling high-end workstations. The recent entry of Tektronix and

Hewlett-Packard has added even more fuel to the fire. Nov., pg. 32.

Attacking The Simulation Bottleneck
Logic simulation is a highly CPU-intensive circuit design verification task that is an essential element in the design cycle. July, pg. 79.

EDIF Breaks CAE/CAD Compatibility Barrier
EDIF allows designers to select from a wider variety of gate array and CAE vendors. Otherwise, designers must wait until the gate array and workstation vendors develop new libraries. Oct., pg. 69.

Efficient Communication Eludes Design Networks
Despite optimistic claims, some translation work is generally needed to ensure accurate communication among engineering, design and test tools. April, pg. 72.

Part 1: Erasable Programmable Logic Devices Simplify Logic Design
EPLDs are surfacing as an alternative to gate arrays and other ASICs. The new generation of EPLDs offers both higher densities and increased performance. Aug., pg. 45.

Part 2: Erasable Programmable Logic Devices Implement A Variety Of Functions
Aided by personal computer design and a versatile structure, EPLDs offer a straightforward answer to many design requirements. Sept., pg. 43.

Managing The VLSI Explosion With Silicon Compilation
As higher integration levels form the foundation of system design, the VLSI problem will become apparent and will necessitate the use of silicon compilers. Sept., pg. 30.

Printed Circuit Board Design Demands Versatile Integrated Tools
Board design programs need flexibility and interactive features to accommodate mixing TTL with ECL, CMOS and discrete analog devices on increasingly denser and larger boards. May, pg. 69.

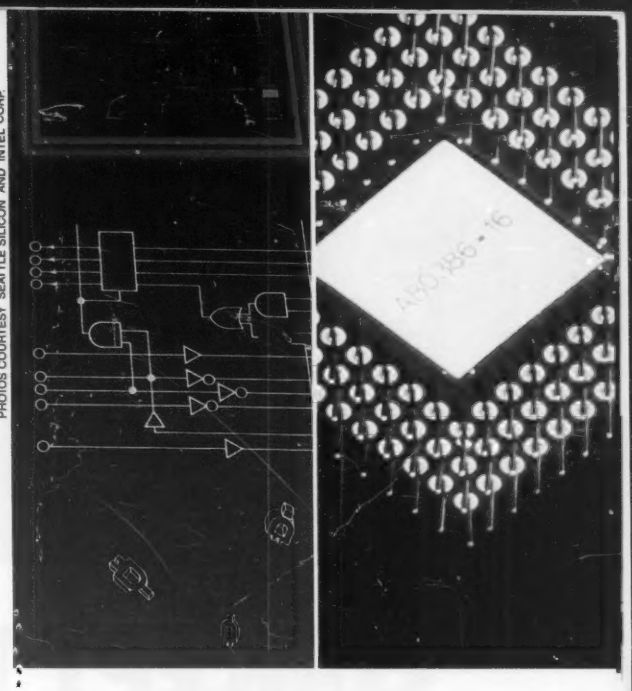
Programmable Logic Soars Into New Dimensions
New technologies and architectures are setting the stage for programmable logic devices (PLDs) to rival gate arrays in the application-specific IC arena. April, pg. 42.

SMDs Make Bipolar Quick And Quiet
To get the highest system-level performance from advanced bipolar logic, designers should consider not only the device itself, but also the device's packaging. Dec., pg. 71.

Standard Cells Pave Road To Systems On Silicon
Standard cell libraries are expanding to include core processors, analog and LSI functions, as vendors develop tools to support the design of systems on a chip. Aug., pg. 36.

Unlocking The Mysteries Of Gate Array Design, Part I
In this three part series, *Digital Design* moves into the design lab to uncover the issues behind workstations and gate array design. Jan., pg. 52.

Unlocking The Mysteries Of Gate Array Design, Part II
Using an engineering workstation to design a gate array has its merits, but users should beware of the pitfalls that lurk ahead. Feb., pg. 66.



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Unlocking The Mysteries Of Gate Array Design, Part III
Having full control over the design cycle is the key factor in gate array design. Do workstations provide that added control? March, pg. 52.

SEMICONDUCTOR TECHNOLOGY

80386 Raises The Flag For Compatibility
The 80386 32-bit microprocessor is the latest microprocessor from Intel Corp. and provides access to the 32-bit world. Oct., pg. 32.

CMOS Changes System Design Considerations
While CMOS has made tremendous inroads in the past few year, TTL and ECL logic families are not likely to disappear. June, pg. 62.

Design Options Increase For Users Of 256K Dynamic RAMs
256K DRAMs are not only ideal for mainframe applications, but also for applications such as graphics systems, workstations, portable computers and microcomputers. Jan., pg. 60.

DMA Controller Relieves Host Of I/O Management
I/O subsystems for high-performance computers must not only process and transfer large amounts of data, but also interface to a large number of peripheral devices. May, pg. 79.

EEPROM Technologies Diversify And Find New Applications
To date, the EPROM market has been relatively untouched by the EEPROM technology, primarily because of the radical difference in cost between the two devices. July, pg. 71.

Effects Of Pipelining On Algorithms In The MC68020
The performance of an algorithm on a microprocessor has changed due to the advent of pipelining found in today's 32-bit microprocessors. June, pg. 72.

Floating Point Unit Extends Arithmetic Processing
Deciding which floating point coprocessor to use is difficult, but considering a few key points can ease coprocessor selection. Dec., pg. 61.

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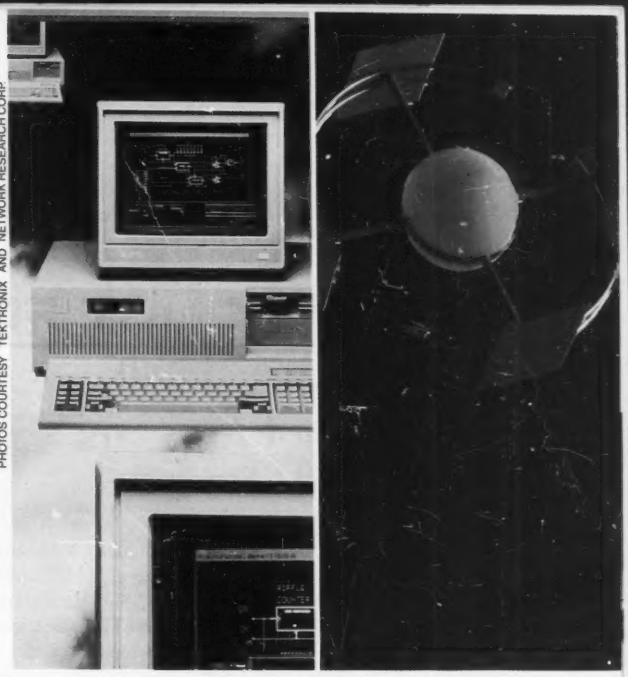

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High Resolution A/Ds Approach Performance Limits
The need for higher resolution analog-to-digital converters is growing as demands by systems architects for higher precision "real world" inputs increase. March, pg. 74.

High-Performance DMA For The VMEbus
By using an integrated peripheral controller and two programmable-array-logic devices, designers can build a basic interface to the VMEbus. Nov., pg. 87.

High-Performance ICs Fuel Up With GaAs
Offering four to six times the speed of silicon-based ECL parts and ten times the speed of silicon CMOS parts, gallium arsenide (GaAs) devices are carving an ever-widening market niche. Oct., pg. 41.

Microcontroller Eases I/O Processing Burden
As power increases in personal computers, greater burden is put on the main system microprocessor. The 8X401, implemented as an I/O processor, can help relieve some of this increased burden. Sept., pg. 79.

Single-Chip Digital Signal Processors Challenge Multichip Solutions
Through the integration of Harvard architectures, fast multipliers and flexible I/O structures, single-chip DSPs continue to present the systems designer with an alternative. Aug., pg. 61.

IMAGING AND GRAPHICS

Array Processors—Increasing Speed By MIPS, MOPS, FLOPS and GOPS
(a., pg. 40) **Single Vs. Double Precision Computation**
Determining whether an application requires double or single precision involves a balance between selecting the right tool for the computation and not investing more than is necessary.
(b., pg. 46) **Integral Array Processor Speeds Image Processing**
Many scientific computation and image processing problems can be performed significantly faster on an array processor.
(c., pg. 50) **Modular Array Processor Features Dual Processor Design**
There are two major problems associated with array processors: lack of compute power and difficulty of use. July, pg. 39.

Color Monitor Specmanship: Look Before You Leap
Choosing a color monitor by interpreting its printed specification can easily lead to disaster. Nov., pg. 44.

Electronic Imaging '85: Digitizing the World
The second international Electronic Imaging show, held October 8-10 in Boston, featured products ranging from image capture devices, image processors to imate displays. Sept., pg. 50.

Flat-Panel Displays: Still In The Future
Flat-panel researchers continue to seek a CRT replacement and point to ways these types of displays can be fabricated. Dec., pg. 54.

Graphics Architecture—New ICs Promise Better Performance
Demands for faster, smaller and less expensive computer graphic systems are driving semiconductor manufacturers to introduce chips providing rapid bitmapped medium-to-high resolution displays. May, pg. 53.

High-Resolution Graphics—Implementing Software In Silicon
Computer graphics has finally evolved to the point where previously compute-intensive functions can be carried out at minimal cost. Aug., pg. 52.

Machine Vision—Coming Of Age
The ability of a computer to see, identify and make a decision rapidly is critically useful in manufacturing, scientific analysis and identification. Feb., pg. 62.

Machine Vision Finds New Applications
The extended range of applications for machine vision systems is made possible by advances in the technology of the sensors and processing architectures used. June, pg. 40.

Peripheral I/O Processor Speeds VAX Performance
Computer systems used for applications needing high rates of data exchange can profit from I/O subsystems that require minimal attention from the host. May, pg. 63.

Preprogrammed Algorithms Ease Development Of Imaging Software
Using preprogrammed algorithms for complex mathematical functions, engineers can concentrate on problem solving and productivity. Sept., pg. 57.

Solid Modeling—A Maturing Technology
Advanced solid modeling systems can depict objects never before seen in 3D, using multiple light sources with photograph-like detail. April, pg. 56.

VDI Spells Portability For Graphic Plotters
The proposed Virtual Device Interface (VDI) promotes device independence rather than binding the applications program with specific drivers for input/output. April, pg. 66.

Video Filters Process Pictures Precisely
Electronic images from robotics to fiber-optic transmission equipment are nearly all subjected to some form of digital processing. Oct., pg. 55.

VME Building Blocks Make Image Processing A Snap
Users of board-level image processors have to meet a range of performance requirements and functional needs. Oct., pg. 48.